



FOOD/ENERGY PYRAMID/CYCLE OUTDOOR LAB TEACHER'S GUIDE

Learning Goal: Learners will be able to differentiate segments of aquatic and terrestrial food webs.

Objectives:

- Learners will learn to differentiate between energy and matter.
- Learners will learn that the ultimate source of energy is the sun.
- Learners will learn the “flow” of matter and energy through an ecosystem.
- Learners will learn the differences between decomposers, producers, primary, secondary, and tertiary consumers.
- Learners will be able to identify organisms and place them into appropriate places within a food web.
- Learners will be able to sketch collected specimens.

Notes:

- Before beginning this lesson, you will need to go through the designated course to look for evidence of animal activity. Set out additional items such as bones, fur, quills for students to find. Choose at least four locations to be flagged as starting points for students (use different colors or numbers).
 - If possible, take instructors through the course before students arrive from school to become familiar with the surroundings and where to find the items.
 - If there are enough volunteers, assign instructors to work as pairs with 4 students to make the experience more engaging (one pair of students/instructor).
 - It also helps to prepare a whiteboard by drawing a food pyramid that matches the outdoor lab packet.
 - During this session, half of the class is involved in the food web lab while half are participating in the aquatic studies review. There is a separate timeline document provided for each of these concurrent sessions to break down their individual timing.
1. Introduce the instructors who will be guiding students through the food web activity. Divide students into small groups (see note above). Groups will start at 4 different locations along the course to create a better learning environment. Go over safety instructions (reference student safe conduct agreement), especially that learners should stay with their groups and within sight of the instructor at all times.
 2. Before the students depart, the module leader should spend 8-10 minutes (out of 50) to discuss the difference between energy and matter and where each one originates. Ask a question to lead students to photosynthesis and use this process to help explain the difference. Plants use matter, such as carbon, to make their cells, but the energy comes from

the sun. This energy and matter are transferred to different organisms as they consume plants and prey. Talk about how energy is used as you go through the food chain and why the pyramid is shaped as it is. The higher up you go in the food pyramid, the more prey/organisms that need to be consumed to get enough energy, so there are fewer tertiary consumers than primary consumers. When organisms die, the matter and energy are used by decomposers and returned to the system. As you are discussing these patterns, have a co-leader write examples at each level on the whiteboard, connecting each level to the sun as a model for what students will be doing in the activity.

3. Give directions to students – there will be one whistle blown 5 minutes before the full group wrap-up and two whistles when they need to be at the starting point. At this point, they will have 8-10 minutes (out of 50) to finish filling out their lab with their individual instructor. The instructors should review, score, and initial the packet (transfer score to the front page).
4. Students should be directed to one of the starting points along the course. Instructors can carry the lab packets and assist students by taking notes as the students observe the evidence and identify where each organism should be located on the food pyramid. Students should be doing the critical thinking, so instructors may need to ask leading questions to help students draw conclusions. Make sure they document their findings by taking pictures of the items and organisms they find.
5. During the module wrap-up, students should complete the last page of the lab by sketching and labeling what they have found in each position on the food cycle. They can use the notes in the food pyramid as a resource. Ask students to put multiple examples under each category. Students should draw arrows in their lab packets to show which direction energy is transferred (example: arrow coming from the sun to the producers, arrow coming from producers to herbivores and omnivores, arrows coming from all organisms to decomposers, etc.).

* Remember to score and initial the lab packets when students are finished (transfer scores to the cover page).